DEFINITIONS

- Pharmacology - study of body functions to chemical changes.

- United States Pharmacopeia - Generic names of drugs and official list of drugs. Like an encyclopedia. This book tells about the drugs make up and actions.

- Physician's Desk Reference - published yearly which includes indications, care, contraindications. Pretty much how to use the drug and when. This book tells about the drug and the applied recommended use of the drug.

- Assay - the strength, purity and effectiveness of a drug can be measured through chemical analysis in a lab.

- Bioassay - the strength, effectiveness of a drug determined to living things. For example a lab rat.

- Agonist - a drug that interact with a receptor to stimulate a response. Also the ending -mimetic is used.

- Antagonist - a drug reaction the interfered or block the receptor to block a response. Also the ending -lytic is used.

- Ampule - is a container used to hold a drug. It a single dose container made from glass and you break the top off. Will learn in lab.

- Vial - is a single or multi use container of drug. You need to inject a needle to withdrawal the drug.
STANDARDS AND POLICIES

- 1906 Congress passed the Pure Food and Drug Act - had to do with mislabeled or adulterated drugs to protect the public from false claims.

- 1938 Food, Drug, and Cosmetic Act - resulted in listing ingredients and justify that it does what you say and how it works and it is safe.

- Controlled Substance Act 1970 - Defined five categories of abusive or addictive drugs.

- Drug Enforcement Agency - created in 1973 and are the sole legal drug enforcement agency in the US.

- Food and Drug Administration - review studies of drug and quality of drug manufacturing.

**Controlled Substance Act**

- Schedule I - addictive and no medical use. Illegal drugs.

- Schedule II - Some medical use and high addictive - morphine, codeine, medical cocaine

- Schedule III - Less abuse than I or II - Contains limited quantities of the Schedule II drugs listed.

- Schedule IV - Low abuse - Valium or benzodiazepine drugs

- Schedule V - Lowest abuse - cough and diarrhea medications.

TO BE A DRUG

- Has to do one or more; treat, prevent, or diagnose
DRUG TERMS

- Indication - when to give it.
- Action/Therapeutic Effect - what it does to the body.
- Dose - amount to be given.
- Contraindication - harmful or fatal if given. Do not give.
- Relative contraindication - weigh the positive and negative effects and what is best for the situation.
  
  Example: 36% change of improving and 6% change of death. Pick one.
- Absolute contraindication - DO NOT DO!!!
- Side effects - a known effect that has nothing to do with the reason or taking the drug.

DRUG TYPES

- Over the counter - no prescription needed. Some abused drugs like Sudafed are still over the counter but locked up.
- Prescription - Go to the doctor and get an order for it.

DRUG NAMES

- Chemical Name - exact description of chemical composition. Example: ethyl 1-methyl-4-phenlisoni-
  procatate hydrochloride
- **Generic Name** - lots of letters. First letter should be lower case. Generic name is always listed with a trade name, if trade name is available. Example: meperidine hydrochloride

- **Trade Name** - given by a manufacturer. Lots of marketing so people can remember it and it's use.

  Example: Demoral


**DRUG SOURCES**

- **Plants** - digoxin from fox glove plant

- **Animal or human** – insulin

- **Minerals** - iron vitamins

- **Microorganism** – penicillin

- **Laboratory made (synthetic drugs)** - Many drugs are this way. Epi 1:10,000 is offered as a synthetic.

**DRUG FORMS**

- **Liquids** - emulsion is fat or oil suspended in liquid. Tincture is alcohol extract of plant or vegetable substance. Spirit is alcohol solution. Aqueous is substance dissolved in water or syrups.

- **Tablet** - powders pressed to pill form.
• Pill - solid sheet of drug cut into easy to swallow shapes. Like minerals and vitamins - a horses pill because it is large.

• Gels - Liquid/gel form.

• Gelatin Capsule - a carrier with drug inside. Helps for time delay or taste.

• Sublingual Spray - Liquid spray placed under tongue.

• Suspensions - two liquids that separate. Need to be shaken first.

• Gases - like oxygen.

Pharmaceutical Phase

• Dissolution - refers to the rate at which a solid drug is dissolved into a user form at a cell level.

• Absorption - site of administration or how the drug enters the body

• Distribution - How does it travel through the body. For example the albumin in the plasma.

• Biotransformation/metabolizes - How is it activated. Liver enzymes most common but acid levels also.

• Excretion - Kidneys eliminate most. Also lungs and GI system are some.

Pharmacokinetics - study of how the drug enters, works and leaves the body.

DRUG ROUTES

• Parenteral - administered by any route other than the GI tract.

• Enteral - administered via the GI tract.
• Intramuscular Injection (IM) - needle placed in middle of large muscle. Needle is 90 degrees to skin.

  Limit to less than 2mL in deltoid and 5mL in butt.

• Subcutaneous Injection (SQ or SubQ) - Drug delivered in fat layer. Needle is 45 degree angle to skin.

  Limit to less than 1.0mL

• Intravenous (IV) - Fastest and most accurate way to get a drug into circulation. Active as soon as administered in many cases.

• Oral (PO) - most medications take 20 to 30 minutes to see benefits. Some drugs like Tylenol and alcohol are absorbed very quickly.

• Rectal (PR) - Liquid or gel form medication. Benefits in about 30 minutes.

• Sublingual - easy to give and relatively fast. Minutes into circulation.

• Inhalation - second fastest into circulation.

• Intraosseous (IO) - Needle into bone marrow of long bone. Just as fast as IV.

• Topical - placed on the skin.

  Ointment

  Paste

  Cream

  Lotion
DRUG Interactions

• Half-life - refers to when 1/2 of the administered amount of active drug is used up. Example: Adenosine 1/2 life is seconds and Amiodarone is 48 days.

• Competitive drug interaction - It is when two or more drugs are trying to use the same process. For example three people trying to use one door at the same time. Example - amiodarone and digoxin. The second drug will back up in the blood plasma because the first drug has occupied the kidneys until it is eliminated. Then the second drug can be eliminated.

• Therapeutic range - When you have enough circulating/absorbed/metabolized drug to get the desired effects.

• Therapeutic index - relates to the safety of the drug. When do 50% of people die and 50% live. Or at the low end when 50% of the people start to see the effects of the drugs. Therapeutic index helps define the therapeutic range.

• Toxic level - Concentration of drug is outside the therapeutic range and is high. Lidocaine and digoxin has a narrow therapeutic range and it is easy to go over.

• Minimum effective concentration - the low end of the therapeutic range to get the drugs effect.

5 "Rights"

• Right patient
• Right drug

• Right form

• Right route

• Right date

• Right amount

AUTONOMIC DIVISION of PNS

• Sympathetic - also know as adrenergic. Fight and flight

Increase blood/activity to muscles and way from GI digestion. Get energy to battle.

Neurochemical Transmitter is: Norepinephrine

Neurotransmitter for the postganglionic fibers is Norepinephrine

So postganglionic is a part of the sympathetic system

• Parasympathetic - also know as cholinergic. Feed and breed

Increase blood/activity to GI digestion and way from muscles. Get tired.

Neurochemical Transmitter is: Acetylcholine (ACh)

Neurotransmitter for the preganglionic fibers is ACh

So preganglionic is a part of the parasympathetic system
Additional info about the Autonomic Nervous System:

- Cholinergic drugs that stimulate the cholinergic system are termed; parasympathomimetic - also some may use the terms cholinergic mimetic or cholinergic agonist. All mean the same the cholinergic system has been situated directly.

- Cholinergic drugs that block the cholinergic system are termed; parasympatholytics - also some may use the terms cholinergic lytic, anticholinergic or cholinergic antagonist. All mean the same the cholinergic system has been blocked directly.

- Adrenergic drugs that stimulate the adrenergic system are termed; sympathomimetic - also some may use the terms adrenergic mimetic or adrenergic agonist. All mean the same the adrenergic system has been situated directly.

- Adrenergic drugs that block the adrenergic system are termed; sympatholytics - also some may use the terms adrenergic lytic, antiadrenergic or adrenergic antagonist. All mean the same the cholinergic system has been blocked directly.

- Beta 1 is receptors for heart increase and Beta 2 is lung dilation.

- Alpha 2 is uptake of norepinephrine and Alpha 1 is vasoconstriction.

Classes of Drugs
• Narcotic Analgesic and Antagonists. Morphine, Demoral and narcan will the antagonist.

• Nonnarcotic Analgesic. Toradol and to a degree NitroNox

• Anesthetics, CNS depressants for surgery for example. You have local and general anesthetics.

• Antianxiety and Sedative-Hypnotic which includes Alcohol, Hypnotic means the forget / wipes the memory. Sedative calms the patient. Antianxiety reduce feelings. Classes are Benzodiazepines (valium and ativan and versed) also Barbiturates (pentobarbital)

• Anticonvulsants, seizure medication

• CNS Stimulants, Anorexiants are a new class of fat blockers in the GI system - keep cholesterol down.

  Amphetamines mainly used to treat kids with hyperactivity disorders.

• Psychotherapeutic Drugs, CNS and Emotion - Drug that balance the MonoAmineOxidase (MAO) affects the neurotransmitters of the brain. The neurotransmitters of the brain are; norepi, ACh, dopamine, serotonin. Antipsychotic agents - Haldol block the dopamine receptors. You calm down

• Antidepressants - helps to balance the MOA and neurotransmitter for balance.
• Skeletal Muscle Blockers, paralyze muscles for intubation. Or medication that relaxes the muscle tissues but not paralyze them.

• Cardiac Glycosides, Makes the heart pump better. Digoxin.

• Antidysrhythmics

  Class 1 - sodium blocking - lidocaine and procainamide stop sodium in heart to control it.

  Class 2 - beta blocking - propranalol, labatolol to slow the heart.

  Class 3 - potassium blocking - amiodarone to slow the heart function.

  Class 4 - calcium blocking - adenosine to slow the heart.

• Antihypertension, Diuretics to remove fluid to lower the BP

  Sympathetic blockers - "olol" ending drugs to reduce work load of heart to lower BP

  Vasodilator drugs - nitrate drugs to make vessels larger to drop BP

  Calcium blockers to reduce work load on heart to lower BP

  Angiotensin converting enzyme inhibitors to lower BP by vasodilatation.
- Antihemorrhologic Agents, Anticoagulants, clot busters, Fibrinolytic agents.

- Bronchodilator drugs, Beta 2 drugs like albuterol

- Emetics - induce vomiting

- Antiemetics - prevent nausea and vomiting

- Antibiotics and there are many.

HOW TO GIVE DRUGS

- Get order and repeat word by word

- Ask Pt if ok to give, allergies, had any lately

- Get drug and do 5 "rights"

- Make sure you recheck a drug at least once before giving drug.

- No not re-cap or bend contaminated needles.

The following are some EMT basic drug until we learn more about the paramedic drugs in class.

Nitroglycerin
• Indication: chest pain

• Action: smooth muscle dilator, dilated coronary vessels.

• Side Effects: head ache, bitter taste, burning under tongue.

• Route: Sublingual - tablet, spray

• Dose: .4mg every 5 minutes up to three times.

• Contraindicated: BP less than 100mmHg. Max dose given.

Oral Glucose

• Indication: Low glucose levels

• Action: increases blood sugar in blood stream

• Side Effects: none in emergency

• Route: mucus membranes

• Dose: 25 to 50 grams

• Contraindicated: not given if nauseated, confused to when the patient cannot follow directions.

Activated Charcoal

• Indication: oral overdose/poisoning

• Action: stops absorption of substance thru GI track

• Side Effects: tar stool, N/V
• Route: Oral

• Dose: Suspension 25 to 50 grams or .5 to 1 gram/kg. If they vomit the first dose may give once again.

• Contraindicated: if nauseated prior to giving any charcoal, not able to follow directions or ingestion of heavy metals or corrosive substance.

Epi-Pen

• Indication: Severe allergic reaction. Dyspnea and lowering Bp

• Action: increase heart rate and dilates lungs. B2 B1 drug

• Side Effects: tachycardia, anxiety.

• Route: IM Lateral thigh

• Dose: .3 adult .15 pedi

• Contraindicated: none in emergency

Syrup of Ipecac

• Indication: Oral poisoning or overdose

• Action: makes you vomit in about 20 minutes

• Side Effects: none, because you are suppose to have N/V.

• Route: oral

• Dose: 30mL in 8oz glass of water
• Contraindicated: if nauseated prior to giving any charcoal, not able to follow directions or ingestion of heavy metals or corrosive substance.

Oxygen

• Indication: Dyspnea

• Action: increase available O2.

• Side Effects: none in emergency

• Route: inhalation

• Dose: dependent on condition

• Contraindicated: none in emergency

Albuterol

• Indication: dyspnea to bronchospasms or congestion

• Action: B2 dilates smooth muscles of lungs

• Side Effects: anxiety, tachycardia, hypertension, shaking, nausea, vomiting, sleeplessness, dry mouth

• Route: MDI or Nebulizer

• Dose: MDI total 180mcg or Nebulizer 2.5mg in 3mL

• Contraindicated: none in emergency

Aspirin (ASA)
• Indication: MI

• Action: slows platelets

• Side Effects: bleeding, ringing in ear.

• Route: oral - chew and swallow

• Dose: 325mg in emergency. 82mg if taken daily if recommended by doctor.

• Contraindicated: allergic to ASA